

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM

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SUBJECT: General Permit for Minor Printing and/or Packaging Facilities

INTRODUCTION¹

This General Permit has been developed to authorize construction and/or operation of facilities with emissions less than major source thresholds and whose emissions are from printing, packaging, or associated processes. This source category is typically divided by technology into six different printing segments: rotogravure, flexographic, offset lithographic, letterpress, screen, and plateless (xerographic, electrostatic, magnetic, thermal, ink-jet, etc.).

The industry includes operations classified by Standard Industrial Classification (SIC) Codes 2752 (Commercial Printing-Lithography), 2754 (Commercial Printing-Gravure), and 2759 (Commercial Printing Not Elsewhere Classified which includes letterpress, flexographic, screen, and other commercial printing). Other four-digit codes under major group SIC Code 27 cover printing-related industries such as publishing, book printing, and other printing-related service trades. The SIC Codes 26 (Paper and Allied Products), 30 (Rubber and Miscellaneous Plastic Products), 32 (Stone, Clay, Glass, and Concrete Products), 34 (Fabricated Metal Products), 39 (Miscellaneous Manufacturing Industries), and 86 (Membership Organizations) may also include printing, packaging, and associated processes, and be eligible for coverage under this general permit.

Only applicants with the same or substantially similar operations, which emit the same types of regulated air pollutants, and which are subject to the same or similar standards, limitations, operating requirements, and monitoring requirements can be covered under this permit. Permits issued to these facilities must address all air emissions from all sources. Thus, this general permit is designed to include all sources typically present at printing and/or packaging facilities, including printing presses, heaters/boilers, packaging operations, and storage tanks. Facilities with other sources of air emissions, unless qualified as a de minimis activity, are not eligible for coverage under this permit. For example, facilities which perform activities such as painting and surface coating will not generally be eligible for coverage under this General Permit since they typically include additional significant emission sources; e.g., surface coating, solvent degreasing, and abrasive blasting, unless it is de minimis (Appendix H).

Table 1 shows the number of facilities in the SIC 27 category, which may be located in Oklahoma that are potentially eligible for coverage under this permit.

TABLE 1
OKLAHOMA FACILITIES IN SIC CODE MAJOR GROUP 27
PRINTING AND PUBLISHING

SIC#	Printing and Publishing Category	No. Facilities	No. Facilities
		ODOC Inventory*	AQD Inventory**
2711	Newspaper	209	2
2721	Periodicals	61	0
2731	Book publishing	31	2
2732	Book Printing	5	1
2741	Miscellaneous Publishing	49	0
2752	Commercial Printing, lithographic	512	5
2754	Commercial Printing, gravure	1	2
2759	Commercial Printing, NEC	259	2
2761	Manifold Business Forms	19	1
Totals =>		1146	15

* Oklahoma Department of Commerce *Manufacturer's Directory, 2000 Edition*

**AQD 1999 *Emissions Inventory*

The breakdown of the number of currently permitted facilities, by permit continuum category, is shown in Table 2.

TABLE 2
EMISSIONS INFORMATION ON THE FACILITIES PERMITTED BY AQD*

SIC #	Industry Type	VOC (TPY)			Total
		< 40	40 - 99	>=100	
2711	Newspaper	-	1	-	1
2721	Periodical	1	-	-	1
2731	Book Publishing				
2732	Book Printing				
2741	Miscellaneous Publishing				
2752	Commercial Printing, lithographic	4	-	1	5
2754	Commercial Printing, gravure	1	-	-	1
2759	Commercial Printing, NEC				
2761	Manifold Business Forms	1	-	-	1
TOTALS =>		7	1	1	9

* TEAM database, as of 08/10/2000

Note that significant portions of the information in this memorandum were excerpted or developed from various references. Thus, a specific reference is not provided for each excerpt. In general, one or more references, as needed, are provided at the section, subsection or paragraph level.

DESCRIPTION^{1, 3}**(Roto)Gravure Printing**

Gravure is a printing process in which an image is etched or engraved below the surface of a plate or cylinder. Nearly all gravure printing is done by rotogravure. On the gravure plate or cylinder (roto), the printing image consists of millions of minute cells. Gravure printing requires very fluid inks that flow from the cells to the substrate at high press speeds.

Solventborne or waterborne ink systems can be used in gravure printing but these ink systems are not interchangeable. Both the printing cylinders and the drying systems are specific to the solvent system in use. Rotogravure printing is usually performed on a continuous web.

Rotogravure printing can be divided into publication and product/package segments. Publication gravure presses in the United States use solvent-borne (toluene/xylene-based) ink systems exclusively. Because of the expense and complexity of rotogravure cylinder engraving, it is particularly suited to long-run printing jobs. Package/product gravure inks include nitrocellulose and water-based inks.

Gravure ink solvents include alcohols, aliphatic naphtha, aromatic hydrocarbons, esters, glycol ethers, ketones, and nitroparaffins. Gravure water-based inks are in regular production use at some facilities to reduce volatile organic compound (VOC) emissions from the press.

In rotogravure printing, the web is printed on one side at a time and must be dried after the application of each color. Thus, for four-color, two-sided publication printing, eight passes through the press are employed, each including a pass over a steam drum or through a hot-air dryer at temperatures from ambient up to 120 °C (250 °F) to remove nearly all of the solvent.

In addition to inks, other materials including adhesives, primers, coatings, and varnishes may be applied with rotogravure cylinders. These materials dry by evaporation as the substrate passes through hot air dryers. Cleaning solutions containing solvents are also used in the rotogravure printing process.

Flexographic Printing

In flexographic printing, the image area is raised from the surface of a plate (like a typewriter) with a rubber (flexible) image carrier. Alcohol-based inks are generally used. The process is usually web-fed and used for medium or long multicolor runs on a variety of substrates, including heavy paper, fiberboard, and metal and plastic foil. Almost all milk cartons and multi-wall bags, and half of all flexible packaging, are printed by this process.

Steam-set inks, employed in the "water flexo" or "steam-set flexo" process, are low-viscosity inks of a paste consistency that are gelled by water or steam. Steam-set inks are used for paper bag printing and produce no significant emissions.

Solvent-based inks are used primarily in publication printing and contain about 75 percent (by volume) organic solvent. The solvent, which must be rubber compatible, may be alcohol or alcohol mixed with an aliphatic hydrocarbon or ester. Typical solvents also include non-aromatic glycols, ketones, and ethers. The inks dry by solvent absorption into the web and by evaporation, usually in high-velocity steam drums or hot-air dryers, at temperatures below 120 °C (250 °F). Most of the solvent-borne flexographic inks contain few or no hazardous air pollutants (HAPs). As in rotogravure publishing, the web is printed on only one side at a time. The web passes over chill rolls after drying; no emissions occur from chilling.

When flexography is used to print corrugated board and most paperboard, water-based inks can be used; however, fast-drying inks are required for plastic films and packaging papers so the web can be rewound or processed into the final product at the end of the press. Flexography is becoming popular for printing pressure-sensitive labels, a process in which the ink must dry quickly without penetration. Use of inks that dry by exposure to ultraviolet radiation (producing no emissions) have been used in label printing with much success.

Additional converting operations, which are often done at the flexographic press stations or in-line with the presses, such as film blowing, laminating, coating, adhesive application, and cutting, may result in additional emissions. Cleaning operations also use solvents that contribute to emissions.

Offset Lithographic Printing

Lithographic printing is characterized by a planographic printing process (i.e., the image and nonimage areas are on the same plane). The image area is ink-wettable and water-repellent, and the non-image area is chemically repellent to ink and hydrophilic. The inks used in lithography are either heatset or non-heatset. In offset printing, the graphic image is applied from an ink-covered print plate to a rubber-covered "blanket" cylinder and then transferred onto the substrate, hence the name "offset" lithography. The substrate in offset lithography can be either a web or sheet. A web substrate can be used with either heatset or non-heatset inks; sheets are used with non-heatset inks only. Some offset presses print on both sides of the paper at the same time (called "perfecting"); others print on one side only or two sides sequentially.

An aqueous solution of isopropyl alcohol is commonly used to dampen the non-image area on the plate and is called the "fountain" or "dampening" solution. The fountain solution in offset lithographic printing has traditionally contained about 15 percent alcohol; at times as high as 30 percent alcohol could be used. Because of environmental pressures, the use of isopropyl alcohol (a VOC) is decreasing. Fountain solutions that contain lower VOCs and/or alcohol substitutes are now in use. The newspaper industry segment of offset lithographic printing predominantly uses alcohol substitutes. Some facilities may use both alcohol and alcohol substitutes; in this case, the alcohol is generally much lower than 15 percent in the fountain solution.

Offset lithographers also use cleaning solutions to clean the press and parts. These cleaning solutions have traditionally been high-solvent-containing (90 to 100 percent) solutions. Some lower-or no-solvent cleaners are becoming available, in which the solvent content is 0 to 30 percent.

Letterpress Printing

Letterpress printing is the oldest form of movable type printing. Letterpress printing uses a relief printing plate (as does flexography) and viscous inks similar to lithographic inks. Various types of letterpress plates are available. These plates differ from flexographic plates in that they have a rigid backing (metal or plastic) and are not "flexible." Both sheet fed and web presses are in use. Web letterpress equipment uses heatset and non-heatset inks. Letterpress printing uses no fountain solutions; the cleaning solvents are similar to those used in lithography. Traditionally, letterpress printing dominated periodical and newspaper publishing; however, the majority of newspapers have converted to non-heatset web offset printing.

Letterpress printing uses a paper web that is printed on both sides, one side at a time, and uses heatset inks, usually of about 40 percent (by volume) solvent. The web is dried after each color is applied. Heatset letterpress ink is similar to heatset lithographic ink. These inks contain resins dissolved in aliphatic hydrocarbons and are dried in hot-air ovens. The inks can be entirely HAP free.

"Moisture set" inks used in some packaging applications contains trimethylene glycol (a HAP). "Water washable" letterpress inks are sometimes used for printing paper and corrugated boxes. These inks contain glycol-based solvents that may contain HAPs.

Screen Printing

Screen printing involves forcing ink through a stencil in which the image areas are porous. The screens are generally made of silk, nylon or metal mesh. Screen printing is used for signs, displays, electronics, wallpaper, greeting cards, ceramics, decals, banners, and textiles. Nearly half of the screen printing plants in the United States print on textiles. Ink systems used in screen printing include ultraviolet cure, waterborne, solventborne, and plastisol, with plastisol (polyvinyl chloride) being mainly used in textile printing. Solvent-based ink systems contain aliphatic, aromatic, and oxygenated organic solvents.

Both sheetfed and web presses are used in screen printing. Depending on the substrate printed, the substrate can be dried after each printing station or, for absorbent substrates, after all colors are printed. Solvent- and waterborne inks are dried in hot-air or infrared drying ovens. Dryer gases are partially recycled and partially vented.

Plateless Printing

This technology is a relatively new process used primarily for short runs on paper substrates. Plateless printing processes include electronic (e.g., laser printers), electrostatic (e.g., xerographic copiers), magnetic, thermal, (e.g., facsimile machines) and ink jet printing. Plateless printing processes are estimated to account for only 3 percent (by value) of printed products. Electrostatic toners and ink jet printer inks may contain HAPs; however the quantities emitted at any location are small.

Packaging

Postpress operations consist of four major processes: cutting, folding, assembling, and binding. Not all printed products, however, are subjected to all of the processes. For example, simple folded pamphlets do not undergo binding. There are many additional lesser postpress finishing processes such as laminating, varnishing, perforating, drilling, etc. Some types of greeting cards are dusted with gold bronze. Printed metal products are formed into containers of various sizes and shapes. Many metal toys are prepared in the same manner. Containers may also be coated on the inside to protect the eventual contents. Other substrates may be subjected to finishing processes that involve pasting, mounting, laminating, and collating. There are also a number of postpress operations unique to screen printing including die cutting, vacuum forming, and embossing. A limited number and volume of chemicals are used in postpress operations. The major type of chemicals used in postpress are the adhesives used in binding and other assembly operations.

In addition, some facilities may re-package bulk chemicals into smaller containers. In some cases these chemicals may be reformulated at different strengths, or in differing proportions. These operations typically include only mixing or packaging operations. However, new labels, logos, etc. are typically printed on the package.

EMISSIONS^{1, 2, 4}

The predominant emissions from printing operations are VOCs contained in the printing inks, fountain solutions, and cleaning solutions. Many of these VOCs are also likely to be hazardous air pollutants (HAPs) or toxic air contaminants (TACs). To a lesser extent, VOCs and HAPs are emitted from packaging operations.

Printing inks vary widely in composition, but all consist of three major components: pigments, which produce the desired colors and are composed of finely divided organic and inorganic materials; binders, the solid components that lock the pigments to the substrate and are composed of organic resins and polymer or, in some inks, oils and rosins; and solvents, which dissolve or disperse the pigments and binders and are usually composed of organic compounds.

In "heatset" printing processes, the solvent evaporates from the ink into the atmosphere during a drying step. In non-heatset processes, minimal VOCs or HAPs are emitted from inks, although emissions still result from fountain solution (offset lithographic printing only) and cleaning solution use. Ultraviolet inks may be used in some applications; in this case, there will be no emissions from inks.

Emissions from proofing presses, cleaning operations, ink storage tanks, and ink mixing operations are relatively minor compared to the emissions during the printing process, but they do contribute to overall emissions.

The type of printing and/or ink (offset heatset, offset non-heatset, gravure, flexographic, etc.) is the most important process operating factor for estimating emissions from printing operations. The next most important process operating factor affecting emissions is the production volume (i.e., amount of material printed [area times length]). The amount of ink used per unit of

substrate (i.e., the relative amount of inked versus non-inked areas), which is determined by the type of product (newspaper, cereal box, greeting card, etc.), is another important factor. The type of substrate has little effect on the quantity of emissions.

Since printing is not a high-profit-margin production activity, it is in the interest of the printer to minimize the use of raw materials and time needed for each product. Emissions minimization also reduces the use of raw materials. A factor that supersedes these goals, however, is customer satisfaction. It is because of the customer's perception of the final product that this source category retains the descriptor of an "art." Consequently, the printer may alter process variables that increase chemical use and, thus, possibly emissions, to achieve an end result that meets the customer's scrutiny. Chemical use may also be varied to reduce production time and product waste.

Rotogravure

In publication rotogravure printing, the inks contain from 55 to 95 percent (by volume) low-boiling-point solvent (average is 75 percent by volume) with low viscosities. It is important that the ink or other coating dry quickly between each color; therefore, the ink vehicle must be evaporated between stations. Organic solvents (such as toluene, xylene, and ethylbenzene, which are HAPs) and alcohol are mainly used as the volatile portion of the ink, but water-based inks are becoming more popular because of their lower cost and less potential for air pollution. However, a single press is not compatible for use with both systems because water-based inks require more equipment drying capacity and a different cell design. Although some rotogravure inks contain solvents, additional solvents may be mixed into the ink as well to obtain the desired viscosity. Publication gravure plants recover a large portion of spent solvents from their ink, some of which is reused and some excess that is sold back to the ink suppliers. Some virgin solvent, which has the same composition as the solvent in the inks, is purchased for replenishment purposes, and a small amount is used for cleaning the presses.

Flexography

The ink used in flexography is of low viscosity because the ink must be fluid to print properly. Most flexographic printing (including all flexographic newspaper and corrugated carton printing) is done with waterborne inks, but alcohol or other low-viscosity, volatile liquids are also used as the ink base. Solvents used must be compatible with the rubber or polymeric plates; thus, aromatic solvents are not used. Some of the components of solvent-based flexographic ink include ethyl, methyl, n-propyl, and isopropyl alcohols; glycol ethers; ethylene glycol; aliphatic hydrocarbons; acetates; and esters.

When flexography is used to print corrugated board and most paperboard, water-based inks can be used; however, fast-drying inks are required for plastic films and packaging papers so the web can be rewound or processed into the final product at the end of the press. When printing pressure-sensitive labels, the ink must dry quickly without penetration.

Offset Lithography

The solvents (high-boiling-temperature petroleum oils >400 °F) in heatset inks are driven off in a hot air or direct-flame dryer (400-500 °F) to set the ink. Non-heatset inks dry by adsorption or oxidation and are not released from the substrate under normal conditions. Approximately 20 to 40 percent of the solvent remains in the substrate with heatset inks; 95 to 100 percent remains in the substrate with non-heatset inks.

Emissions from the fountain solution will depend on whether alcohol or non-alcohol additives are used. The concentration of VOCs in the fountain solution can vary from facility to facility, and from job to job within any one facility.

Solvents used for press cleanup are usually kerosene-type high-boiling-point hydrocarbons, sometimes mixed with detergents. These materials can contain up to 100 percent VOCs but are generally free of HAPs. Low-VOC cleaning solutions are also in use where the VOC content is less than 70 percent, and often less than 30 percent VOCs.

Letterpress

Only web presses using solventborne inks are sources of emissions in this industry. Letterpress newspaper and sheetfed printing use oxidative drying inks and are not a source of emissions. Cleaning solutions are used with all letterpress operations.

Screen Printing

Ink systems used in screen printing include ultraviolet cure, waterborne, solventborne, and plastisol, with plastisol (polyvinyl chloride) being mainly used in textile printing. Solvent-based ink systems contain aliphatic, aromatic, and oxygenated organic solvents.

In-Process Fuel

Fuels such as oil or natural gas are used to operate the dryers in heatset offset lithography, heatset letterpress, gravure, and alcohol-based flexography. In some cases, recovered solvent is used as supplemental fuel in the dryer. A boiler may be used to generate steam for steam-/water-based flexography and to regenerate the activated carbon beds used as control devices. The combustion byproducts include particulate matter (PM), particulate matter with diameters less than 10 µg (PM₁₀), sulfur oxides (SO_x), nitrogen oxides (NO_x), VOCs, and carbon monoxide (CO). Recovered or evaporated solvent may be burned in the dryer.

Packaging

Emissions from packaging operations include low levels of VOCs and HAPs. Packaging operation emissions can be estimated using material balance methods.

Storage Tanks

Printing operations may use storage tanks to store inks, solvents, and fuels (oil). Emissions are typically calculated using the methods in AP-42 or EPA computer software.

PERMIT STRUCTURE

The general permit for printing and/or packaging facilities is designed for minor facilities only, but the single permit can authorize both construction and operation, and can be used both for new sources and for modification at existing sources. It has been developed to include requirements for all sources with emissions above the de minimis level of 5 TPY but less than major source thresholds, e.g., 100 TPY, if they meet the eligibility requirements. Major sources (e.g., ≥ 100 TPY of any criteria pollutant and/or facilities emitting above 10 TPY of any single HAP or 25 TPY of a combination of HAPs) will need to obtain coverage under an individual permit.

The general permit is structured so that eligible facilities can obtain an Authorization to Construct and Authorization to Operate under the permit, or can obtain an individual construction permit and then an Authorization to Operate under the permit. This should allow applicants the greatest flexibility for obtaining coverage under the permit.

No site-specific determinations can be made in issuance of an Authorization under a general permit. However, once these site-specific determinations have been completed and drafted into an individual construction permit as specific conditions or emissions limitations, they can then easily be incorporated into the Authorization to Operate under a general permit. Because no site-specific determinations are made in issuance of an Authorization to Construct under the general permit, certain other options usually available by regulation must be disallowed. Facilities that emit greater than the de minimis levels for category "A", "B", or "C" TACs, as defined in OAC 252:100-41-43, have been excluded from coverage by an Authorization to Construct issued under this permit. Emissions of any TAC above de minimis requires a site-specific ambient air quality impact analysis be performed, and a case-by-case BACT determination be performed for emission of a category "A" TAC above de minimis levels. Alternate emissions reduction authorizations are not allowed under an Authorization to Construct under this permit, as these site-specific limitations require Air Quality Council approval. Similarly, several regulations allow exceptions from specific requirements "if approved by the Executive Director." These approvals also require a site-specific determination that cannot be reasonably made in issuance of an Authorization to Construct under this permit.

The permit is formatted to include all applicable requirements in OAC 252:100 – Air Pollution Control. Specific conditions apply to the entire facility. Included are a facility-wide emissions cap, work practice requirements, and monitoring and recordkeeping conditions to assure compliance with applicable requirements. Additionally, a section of standard conditions lists those requirements applicable to all minor facilities.

Generally, specific numeric emissions limitations are required for sources that have the potential to exceed a threshold value or violate an applicable requirement. This general permit, however, establishes these limitations as a facility-wide cap on emissions from the facility, rather than establishing limitations on individual emission units. The permit initially establishes a facility-wide emissions cap based on the maximum production rate, which may include pre-approved changes foreseeable at the time of permit application. Certain modifications, e.g., adding equipment or changing inks or solvents, are pre-approved so long as the facility remains minor.

Calculation of actual emissions is required as a compliance demonstration method. This is typically given as 12-month rolling calculation. A direct comparison of the calculated emissions

can then be compared to the permitted level to determine compliance with the specific condition in the permit.

This approach should greatly reduce the burden on both the permittee and agency by eliminating the need for a new Authorization to Construct or Operate when making certain changes to the facility. Notification to DEQ within seven (7) days following the start of operation is required for certain specified changes that do not result in an exceedance of the facility-wide emissions cap previously established in an Authorization to Operate.

EMISSIONS LIMITATIONS

Emissions limitations specified in the permit are established from applicable federal and state requirements, or from a limitation that the source assumes to avoid an applicable requirement, or from limitations established in previously issued state or federal permits for the facility, provided, however, that source assumed limitations and/or limitations from previously issued permits must be equivalent to or more stringent than the federal and state applicable requirements.

Because of the similarity of emissions and emissions units at printing facilities, specific numeric emissions limitations need not be developed for each emissions unit. In general, specific numeric emissions limitations are required for those sources that have the potential to violate an applicable requirement. For example, specific numeric emissions limitations must be developed for all emissions units at the facility if total actual emissions from the facility exceed major source thresholds (e.g., 80 TPY of a criteria pollutant or 8/20 TPY of a HAP - 80% of criteria pollutant and HAP levels). These limitations are established as a facility-wide cap.

Calculation of actual emissions is required as a compliance demonstration method where a specific numerical limitation is given in the permit. This is typically given as an annual rolling-month calculation. However, other shorter-term calculations may be required for a particular requirement. A direct comparison of the calculated emissions can then be compared to the permitted level to determine compliance with the specific condition in the permit. In those cases where a numerical limitation is not specifically developed to demonstrate compliance, other methods (e.g., work practices, parametric monitoring, modeling analyses, etc.) are required by the permit to assure compliance. These are specified as "Operational Conditions" in the permit.

The most flexibility can be obtained under an Authorization to Operate under this permit when the applicant requests that a facility-wide cap be established at a level not to exceed major source thresholds. Note that facilities covered by a general permit, are not required to obtain an Authorization to Construct when adding a piece of equipment subject to NSPS or NESHAP, or when the change results in an emissions increase greater than 5 TPY. An Authorization to Construct, and a new Authorization to Operate, is not needed for most changes at the facility, so long as facility emissions after the change do not exceed the cap. However, the permit must include effective permit limits that assure that such changes do not exceed the facility-wide cap. To assure continuing compliance with these limits, the permittee must estimate emissions periodically—especially after a change at the facility, and maintain a current equipment inventory to document that such changes do not cause emissions to exceed the cap.

Compliance with the Cap

The VOCs released into the air by printing operations result primarily from the evaporation of the VOCs contained in the raw materials such as inks, fountain solution, and cleaning solutions used in the printing processes. The most straightforward method to assure compliance with the emissions cap for VOCs from the printing operations is to use an inventory method that tracks the amounts of each ink, solvent, etc., used and the type of emission controls for each unit. The amounts of VOCs recycled, as well as the amount of inks that are retained in the substrate and not released during printing can also be considered in estimating emissions.

The most straightforward method to assure compliance with the emissions cap for fuel-burning equipment is to restrict eligibility to equipment that burns only certain fuels. Since the amount of emissions generated by any fuel-burning equipment is proportional to the heat and sulfur content of the fuel, the size of the burner, the number of hours the equipment is operated, and whether it uses a control device (e.g., scrubber, catalytic converter, etc.), then limiting fuel type is the easiest method to limit both the types of pollutants and their emissions.

Fuel-burning equipment at printing plants in Oklahoma are typically fired with "commercial grade" natural gas, liquid petroleum gas (LPG), diesel, or #2 through #6 fuel oil. Compliance with the NO_x, CO, NMHC, SO₂ and PM cap for these fuels can be determined, and documented by the permittee, by recording the number of hours the equipment is operated, provided the heat and sulfur content range of the fuel is known. Associated emissions can be estimated using factors from AP-42, once a supplier's certification establishes the sulfur content and, in the case of fuel oil, grade. Compliance with Subchapter 31 sulfur oxide requirements for fuel-burning equipment is demonstrated at Appendix A of this evaluation using a "worst case" lower heating value and maximum sulfur content of the particular fuel. The worst case analysis for commercial grade natural gas yields sufficiently low sulfur oxide emissions to warrant inclusion in the general permit without further demonstration of compliance. The worst case analysis for #2 through #6 fuel oil indicates the need for permittees to verify total sulfur content on a once per load basis. Use of other fuels will most likely require a site-specific determination of heat or sulfur content. Thus, the permit restricts eligibility to only that fuel-burning equipment fired with "commercial grade" natural gas, LPG, diesel, or #2 through #6 fuel oil.

Storage tank emissions at these facilities are related to the number of turnovers and vapor pressure. However, most tanks are used to store fuels, solvents, or inks. Thus, the number of turnovers is limited. The criteria pollutant emissions eligibility restriction will limit production, which should limit fuel use, and thus tank size, so that VOC emissions from tanks will not have the potential to violate the standard.

Emissions from other activities at the facility are typically dependent upon production. Thus, compliance with the cap is easily demonstrated by calculation of their associated emissions using a material balance method or factors from AP-42.

ELIGIBILITY

In order to provide the broadest coverage to applicants under this permit and to assure compliance with all applicable requirements eligibility must be restricted to those minor facilities whose emission units are addressed in this permit. The permit has been developed for a facility designed and operated for the primary purpose of printing and/or packaging.

Emission units identified as typically present at such a facility, and addressed in the permit, include printing presses, heaters/boilers, packaging operations, and storage tanks. In addition, those emission units identified as de minimis are also recognized as typically present at such a facility, and are addressed in the permit. Any other emission units subject to an applicable requirement not included in this permit makes that facility ineligible for coverage under this permit.

In general, the following facilities are not eligible for coverage under this permit.

1. Facilities for which material facts were misrepresented or omitted from the application and the applicant knew or should have known of such misrepresentation or omission.
2. Facilities with emissions units that are subject to:
 - a. OAC 252:100-8 (Permits for Part 70 Sources).
 - b. OAC 252:100-15 (Motor Vehicle Pollution Control Devices).
 - c. OAC 252:100-17 (Incinerators).
 - d. OAC 252:100-21 (Wood-Burning Equipment).
 - e. OAC 252:100-23 (Cotton Gins).
 - f. OAC 252:100-24 (Grain, Feed, or Seed Operations).
 - g. OAC 252:100-35 (Control of Emissions of Carbon Monoxide).
 - h. 40 CFR Part 59, Subpart B (National VOC Standards for Automobile Refinish Coatings).
 - i. 40 CFR Part 59, Subpart D (National VOC Standards for Architectural Coatings)
 - j. 40 CFR Part 82, Subpart B, Subpart D, Subpart E, Subpart G, and Subpart H (Stratospheric Ozone Protection).
 - k. 40 CFR Part 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities).
3. Any major source (as defined in OAC 252:100-8-2).

The following facilities are not eligible for coverage under this permit, but may be eligible for coverage under an Authorization to Operate if they obtain an individual construction permit and any limitations in that permit are incorporated into their Authorization to Operate under this permit.

1. Facilities with fuel-burning equipment fired with fuels other than: natural gas, liquid petroleum gas (LPG), diesel with a sulfur content less than 0.8% by weight, or #2 through #6 fuel oil with a maximum of 0.8 wt% sulfur.

2. Facilities that store VOCs with a vapor pressure greater than 1.5 psia in storage tanks built after December 28, 1974, with a capacity greater than 151 m³ (40,000 gallons); or with a capacity greater than 400 gallons that are not equipped with a submerged fill. Thus, requirements do not need to be included in the general permit for vapor recovery/vapor disposal systems and their associated control devices.
3. Facilities located in Tulsa County that store gasoline or other VOCs (with vapor pressure greater than 1.5 psia) in storage tanks with a capacity greater than 2,000 gallons. Thus, requirements do not need to be included in the general permit for vapor recovery/vapor disposal systems, and their associated control devices.
4. Facilities with equipment subject to the existing equipment standards for sulfur dioxides at OAC 252:100-31-7(a).
5. Facilities with emissions units subject to:
 - a. NSPS requirements under 40 CFR Part 60 not addressed by Subpart A, Subpart Dc, Subpart Kb, Subpart QQ, and Subpart FFF, or
 - b. NESHAP requirements under 40 CFR Part 61, or
 - c. NESHAP requirements under 40 CFR Part 63 not addressed by §63.829(d) and §63.830(b) of Subpart KKunless such requirements are specifically incorporated into the Authorization to Construct/Operate issued under this permit as provided for under Part 4, Section V of this permit.
6. Facilities with emission units that are not exempted from Part 5 ("Toxic Air Contaminants") of OAC 252:100-41, as specified in OAC 252:100-41-43.
7. Facilities located in an area that is federally designated as non-attainment.
8. Facilities that request an Alternative Emissions Reduction Authorization under OAC 252:100-11.

The DEQ may not issue a permit authorization sought by an applicant if the applicant has not paid all monies owed to the DEQ, or is not in substantial compliance with the Environmental Quality Code, rules of the Board and the terms of any existing DEQ permits and orders. The DEQ may impose specific conditions on the applicant to assure compliance and/or a separate schedule that the DEQ considers necessary to achieve required compliance (per OAC 252: 4-7-15(b)(1)).

Facilities that are not in compliance with all applicable State and Federal air requirements may become eligible for coverage under this permit through submission of a compliance plan meeting the requirements of Part 3 of the Permit.

POLLUTION PREVENTION^{5, 6, 7}

Pollution prevention (P2) is integrated into this permit using a six-fold approach. These six approaches are:

1. Permit Flexibility
2. Pollution Prevention Permit Conditions
3. Inclusion of Pollution Prevention Information in the Application
4. Accelerated Permit Review
5. Extended Compliance Time
6. Alternative or Reduced Monitoring for Pollution Prevention

Permit flexibility is provided by three primary methods, i.e., incorporating both construction and operating requirements into one general permit, allowing certain pre-approved changes without requiring a permit modification, and by allowing the use of a facility-wide emissions cap. Specifically, a facility may request issuance of either an Authorization to Construct and then Authorization to Operate, or an individual construction permit, then an Authorization to Operate under the General Permit. Flexibility is also provided by allowing certain pre-approved changes, such as the addition of new emission units or other changes that result in an emissions increase so long as they are foreseeable at the time of permit application and are addressed in the facility-wide cap, as well as the use of those alternative operating scenarios that are foreseeable at the time of permit application. Finally, flexibility is provided by establishing a facility-wide emissions cap, rather than individual limits on ink or solvent usage. Thus, the facility has flexibility to change the ink or solvent without permit modification as long as resulting emissions are under the cap.

Specific pollution prevention permit conditions are also included in the permit. These conditions require the facility to maintain an annual inventory of emissions. This inventory is to be used to develop an emission history for the facility. For each subsequent permit modification, this inventory and history may be used to assess potential pollution prevention alternatives as part of the application process. In addition, specific conditions are included in the permit that require good operating and housekeeping procedures to be followed to prevent pollution. Alternative or reduced monitoring is also provided in this permit for facilities that implement pollution prevention measures that result in emissions reductions below regulatory thresholds. The permittee is also offered an opportunity to obtain an emission reduction credit based on implementation of pollution prevention measures to reduce VOC or TAC emissions. A reduction credit will be given, depending upon the ability of the permittee to document implementation of various measures.

Pollution prevention information is provided to the applicant as part of the application process for an Authorization under this General Permit. This information includes advice on how to develop a site-specific pollution prevention plan for the facility, and an example plan that can be used at the site. In addition, information on compliance assistance with pollution prevention planning from DEQ is also provided.

Accelerated permit review will be provided to applicants making facility changes that involve pollution prevention projects. This accelerated permit review will be offered, in an informal

process, between staff of the Air Quality Division and the Customer Services Division. On request, the Customer Assistance office makes a determination whether the focus of the change is P2. The Customer Assistance office then notifies the Air Quality Division and informally requests that the permit be expedited.

The DEQ may extend compliance time for applications that include P2 measures. This extension of the compliance schedule may be granted where the long term benefits that may accrue from a facility's implementing P2 outweigh the short-term environmental detriment of not implementing some other type of other pollution control.

APPLICABLE RULES AND REGULATIONS

Applicable rules and regulations are given below for each emission unit, and also for fugitive emissions authorized in this permit, including facility-wide requirements, printing presses, heaters/boilers, packaging operations, and storage tanks. For brevity, only those applicable requirements that are specific to the particular emissions unit, and not addressed in the facility-wide requirements, are covered in each section.

FACILITY-WIDE REQUIREMENTS

Oklahoma Air Pollution Control Rules

OAC 252:100-7 (Permits for Minor Facilities)

[Applicable]

Part 1 includes definitions and subjects all permitting to the tiered Uniformed Permitting Act. Permits are required to meet public review requirements consistent with the Tier System given in the Uniform Permitting Act.

Part 2 establishes fees for construction and operating permits, Authorizations issued under General Permits, and applicability determinations.

Part 3 establishes construction permit categories and requirements, including that a construction permit require the permittee to comply with all applicable air pollution rules, federal NSPS and NESHAP established under Sections 111 and 112 of the Federal Clean Air Act and to not exceed ambient air quality standards. A construction permit and subsequent operating permit is required for new facilities. A permit modification is also required when making certain modifications to a facility.

Part 4 establishes operating permit requirements and requires a compliance demonstration of the construction permit, emission limits, and air pollution control requirements prior to issuing an operating permit.

However, no specific emission limitation, work practice condition, or other emission standard, or criteria is specified in this Subchapter.

The permit assures compliance with this regulation using the following approach:

The permit requires an applicant to obtain an Authorization to Construct and Authorization to Operate under this General Permit before starting construction and operation of an eligible facility. Tier II review will be provided for this permit and Tier I review will be provided for any Authorizations issued hereunder. In lieu of an Authorization to Construct, an applicant may obtain an individual construction permit, then apply for an Authorization to Operate under this permit. Permit conditions have been included in the permit which provide that conditions from an individual construction permit can be incorporated into the Authorization to Operate as long as the conditions are equivalent or more stringent than the corresponding conditions in the General Permit. Operational conditions have been included in the permit to require a source to construct and operate all emission units and associated control equipment within a practical range of operating conditions so as to achieve, on a continuous basis, a level of emissions that complies with applicable requirements. Operating and compliance requirements, as well as monitoring and recordkeeping requirements are specifically addressed in the permit for control devices. An initial compliance inspection of the facility will be conducted by the AQD prior to preparing the authorization to operate. Conditions have also been included in the permit to require a compliance demonstration prior to issuance of an Authorization to Operate and

continuing compliance demonstrations to assure that the source continues to meet applicable requirements. Compliance with the facility-wide emissions limitations shall be determined by calculating the actual emissions from all emission units located at the facility. Such emissions estimates shall be calculated as specified in the specific conditions for each particular emissions unit or for equipment not specified using the latest approved version of AP-42, Compilation of Air Pollution Emission Factors. Emissions limitations are required for those sources that have the potential to violate an applicable requirement. These limitations are established as part of the facility-wide cap, not to equal or exceed 100 TPY of any criteria pollutant, nor to equal or exceed 10 TPY of any single HAP, or 25 TPY of all HAPs. Specific conditions are also included in the permit to address any ambient air quality standards or NSPS and NESHAP requirement. Currently, under the SIP, minor facilities are not required to demonstrate compliance with the NAAQS. However, a permit condition is included in the permit that requires the facility to not exceed the ambient air quality standards. In addition, eligibility for an Authorization to Construct is restricted to those facilities which do not have emissions of TACs exceeding Subchapter 41 de minimis thresholds. Thus, this condition shall ensure compliance with the MAAC standards. Currently, no NESHAPs are applicable to minor printing facilities. However, the permit allows facilities that become subject to a NESHAP to incorporate those requirements into an authorization. A new or modified facility, authorized under an individual construction permit or Authorization to Construct under this permit, must apply for an Authorization to Operate within 60 days of commencing operation. An existing facility, adding equipment subject to an NSPS or NESHAP not otherwise addressed in the permit (i.e., NSPS Subpart Dc, Kb, FF, and QQ), or making modifications that require a case-by-case determination, requires that an individual construction permit be issued for the modification. All other facility modifications may be constructed without an Authorization to Construct, or individual construction permit, provided that the permittee notifies the DEQ in writing of the intent to construct and operate within 7 days of the start of operation. A new Authorization to Operate is not required, unless the modification is authorized under an individual construction permit.

OAC 252:100-9 (Excess Emission Reporting Requirements)**[Applicable]**

Subchapter 9 requires an owner or operator of a regulated facility to report all excess emissions from an air pollution source caused by malfunction, shutdown, start-up, or regularly scheduled maintenance that is in violation of the applicable air pollution control rule. However, no specific emission limitation, standard, or criteria is specified in this subchapter.

The permit assures compliance with this regulation using the following approach:

Conditions are included in the standard conditions section of this permit which require prompt reporting to AQD should excess emissions occur.

OAC 252:100-13 (Open Burning)**[Applicable]**

This subchapter prohibits open burning of refuse and other combustible material except in compliance with OAC 252:100-13-7 and 9.

The permit assures compliance with this regulation using the following approach:

Subchapter 13 applies to all facilities. Therefore, the permit includes a condition that requires compliance with this subchapter. However, open burning is not expected to be performed at printing facilities. Therefore, no initial compliance demonstration or continuing monitoring, recordkeeping, or reporting requirements associated with this subchapter are included in the permit.

OAC 252:100-25 (Visible Emissions and Particulates)**[Applicable]**

This subchapter states no person shall allow or permit the discharge of any fumes, aerosol, mist, gas, smoke, vapor, particulate matter, or any combination thereof, exhibiting greater than 20 percent equivalent opacity except for short-term occurrences. At no time may the opacity exceed 20 percent for one six-minute period in any consecutive 60 minutes, nor more three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity.

The permit assures compliance with this regulation using the following approach:

Subchapter 25 compliance demonstrations require an opacity reading by a Certified Visible Emission Evaluator using Method 9 (40 CFR Part 60, Appendix A). The DEQ will, however, accept use of an alternative test method under limited circumstances. The permittee can demonstrate the presence or absence of visible emissions using Method 22 (40 CFR Part 60, Appendix A). The term "Fugitive emissions" as used in Method 22 shall be deemed to include all units subject to Subchapter 25 requirements. If visible emissions are present, Method 9 must be used to determine their level. Method 22 does not require a certified visible emissions observer, thus giving the facility some flexibility in meeting this requirement. Any source subject to an NSPS opacity limit is exempt from OAC 252:100-25-3 requirements.

OAC 252:100-29 (Control of Fugitive Dust)**[Applicable]**

This subchapter prohibits the handling, transportation, or storage of any substance or material in a way that may enable fugitive dust to become wind-borne, and result in air pollution, without taking reasonable precautions or measures to minimize atmospheric pollution. Subchapter 29 further prohibits discharge of visible fugitive dust beyond the property line on which the emissions originated in such a manner as to damage or interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or to interfere with the maintenance of air quality standards. A list of reasonable precautions is specified in this subchapter.

The permit assures compliance with this regulation using the following approach:

The permit requires that the facility respond to any fugitive dust complaint within 48 hours. The facility shall take any necessary action to resolve the complaint, or they may refer the complaint to DEQ for response and investigation.

OAC 252:100-31 (Control of Emission of Sulfur Compounds)**[Applicable]**

Subchapter 31 limits the emissions of sulfur compounds from existing and new equipment. The existing equipment (constructed before July 1, 1972) limit for SO₂ is 1,300 µg/m³ (0.50 ppm) in a five (5) minute period of any hour, a one (1) hour average exposure of 1,200 µg/m³ (0.46 ppm), a three (3) hour average exposure of 650 µg/m³ (0.25 ppm), or a 24-hour average exposure of 130 µg/m³ (0.05 ppm) of sulfur dioxide contributed from any one source. The new gas fuel-burning equipment limit is 0.2 lbs/MMBTU heat input, (which is equivalent to approximately 0.2 weight percent sulfur in the fuel gas which is equivalent to 2,000 ppm sulfur). Hydrogen sulfide from any new or existing equipment is limited to 0.2 ppm in a 24-hour average. These limitations shall not apply to ambient air concentrations occurring on the property from which such emission occurs, providing such property, from the emission point to the point of any such concentration, is controlled by the person responsible for such emission.

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct under the permit is restricted to those facilities using "commercial grade" natural gas, liquid petroleum gas, diesel, or #2 through #6 fuel oil. Compliance with Subchapter 31 sulfur oxide requirements for fuel-burning equipment is included as Appendix A of this memorandum, using a "worst case" lower heating value and maximum sulfur content of the particular fuel. The worst case analysis for natural gas yields a sufficiently low sulfur oxide emissions to warrant inclusion in the general permit without further demonstration of compliance. The worst case analysis for #2 through #6 fuel oil indicates the need for permittees to verify total sulfur content on a once per load basis, with 0.8% wt% sulfur maximum. Use of other fuels will most likely require a site-specific determination of sulfur content. Eligibility for an Authorization to Construct under the permit is restricted to facilities with equipment that is not subject to the existing equipment standards of this subchapter. Adding "existing equipment" to a facility will most likely require modeling to demonstrate compliance with ambient SO₂ standards. Such a case-by-case determination must be made in issuance of an individual permit. Thus, eligibility for an Authorization to Construct under this permit is restricted to "new equipment."

OAC 252:100-43 (Sampling and Testing Methods)**[Part 1 Applicable]**

Part 1 specifies that all required testing be conducted using methods approved by the Executive Director under the direction of qualified personnel.

Part 3 specifies specific methods to be used to determine leakage from gasoline trucks and associated vapor control systems.

The permit assures compliance with this regulation using the following approach:

A standard condition is included which states that all required tests shall be made and the results calculated in accordance with test procedures described or referenced in the permit and approved by Air Quality. Part 3 is not applicable since these facilities do not include gasoline tank truck loading facilities.

OAC 252:100-45 (Monitoring of Emissions)**[Applicable]**

Subchapter 45 outlines the basic requirements for monitoring of emissions and their recording and reporting. The use of any credible evidence in establishing a violation is also addressed. However, no specific emission limitation, work practice condition, standard, or criteria is specified in this subchapter.

The permit assures compliance with this regulation using the following approach:

Permit conditions include minimum monitoring requirements for control devices associated with emission units addressed in this permit. In addition, testing must be performed as specified in 40—CFR Parts 51, 60, 61, 63, and 75, as applicable, unless otherwise specified in an Authorization under this permit.

Federal Regulations

Certain state regulations require compliance with federally promulgated regulations. OAC 252:100-7-15(d) requires that construction permits include all applicable requirements, including NSPS and NESHAP. In addition, OAC 252:100-45 provides that any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of the State Implementation Plan (SIP).

Credible Evidence, 40 CFR Part 51**[Applicable]**

This regulation clarifies that "any credible evidence," including data gathered from means other than the use of a specified "reference test method," can be used to prove an alleged emission limitation violation.

The permit assures compliance with this regulation using the following approach:

Conditions are included in the Standard Conditions section of the permit to address the credible evidence requirements.

New Source Performance Standards (NSPS), 40 CFR Part 60**[Applicable]**

NSPS specifies standards of emissions of air pollutants which reflect the degree of emission limitation achievable through the application of the best system of emission reduction which, taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements, the Administrator of EPA determines has been adequately demonstrated. NSPS apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication of the standard applicable to that facility. Certain notification, recordkeeping, emissions limitations, performance tests, and monitoring requirements are specified in the NSPS regulations.

The permit assures compliance with this regulation using the following approach:

Conditions are included to address the NSPS general notification, recordkeeping, emissions limitations, performance test, and monitoring requirements. Conditions specific to a particular NSPS are included for each emissions unit that may be determined to be an affected unit. Unless incorporated by reference into the Authorization, eligibility for this permit is restricted to facilities whose emissions units are not subject to any NSPS subpart other than: NSPS for Small Industrial-Commercial-Institutional Steam Generating Units (Dc), Volatile Organic Liquid Storage Vessels for which construction, reconstruction, or modification commenced after July 23, 1984 (Kb), Graphic Arts Industry: Publication Rotogravure Printing (QQ), and Flexible Vinyl and Urethane Coating and Printing (FFF).

NESHAP, 40 CFR Part 63**[§63.829(d) & §63.830(b) Applicable]**

Subpart KK, National Emission Standards for the Printing and Publishing Industry, applies to the operations of publication rotogravure, product and packaging rotogravure, or wide-web flexographic printing presses that are major sources, or located at facilities that are major sources of HAPs (emit more than 10 TPY of single HAP, or 25 TPY of all HAPs). Facilities that agree to use less than the major source levels of HAPs are considered area sources, and subject only to the requirements of §63.829(d) (records of HAP use) and §63.830(b) (submission of an initial notification). Use is defined as any HAP added to any process or utilized for any reason on the premises, regardless of how much is reclaimed, recycled, or collected for waste disposal.

There is one MACT standard scheduled for promulgation which may affect facilities eligible for this general permit: Subpart JJJJ "Paper and other Webs Surface Coating." The DEQ Air Quality Division will reopen this permit if this or any other standard becomes applicable. Certain notification, recordkeeping, emissions limitations, performance tests, and monitoring requirements are specified in the NESHAP regulations.

The permit assures compliance with this regulation using the following approach:

Conditions are included to address the NESHAP general notification, recordkeeping, emissions limitations, performance test, and monitoring requirements. Eligibility for this permit is restricted to facilities whose emissions units are not subject to any NESHAP subpart other than Subpart KK, unless incorporated by reference into the Authorization. Conditions to meet the area source requirements of Subpart KK are included in the Federal Regulations section of the permit.

Stratospheric Ozone Protection, 40 CFR 82**[Subpart A and Subpart F Applicable]**

These standards require phase out of Class I & II substances, reductions of emissions of Class I & II substances to the lowest achievable level in all use sectors, and banning use of nonessential products containing ozone-depleting substances (Subparts A & C); control servicing of motor vehicle air conditioners (Subpart B); require Federal agencies to adopt procurement regulations which meet phase out requirements and which maximize the substitution of safe alternatives to class I and class II substances (Subpart D); require warning labels on products made with or containing Class I or II substances (Subpart E); maximize the use of recycling and recovery upon disposal (Subpart F); require producers to identify substitutes for ozone-depleting compounds under the Significant New Alternatives Program (Subpart G); and reduce the emissions of halons (Subpart H).

The permit assures compliance with this regulation using the following approach:

Subpart A identifies ozone-depleting substances and divides them into two classes. Class I controlled substances are divided into seven groups; the chemicals typically used by the commercial printing industry include carbon tetrachloride (Class I, Group IV) and methyl chloroform (Class I, Group V). A complete phase-out of production of Class I substances is required by January 1, 2000 (January 1, 2002 for methyl chloroform). Class II chemicals, which are hydrochlorofluorocarbons (HCFCs), are generally seen as interim substitutes for Class I CFCs. Class II substances consist of 33 HCFCs. A complete phase-out of Class II substances, scheduled in phases starting by 2002, is required by January 1, 2030. Conditions are included in this section of the permit to address the recordkeeping requirements specified at §82.13 of this regulation. Recordkeeping requirements specific to commercial printing facilities include those for importers of Class I substances, or for persons who destroy class I controlled substances.

Subpart F requires that any persons servicing, maintaining, or repairing appliances except for motor vehicle air conditioners; persons disposing of appliances, including motor vehicle air conditioners; refrigerant reclaimers, appliance owners, and manufacturers of appliances and recycling and recovery equipment comply with the standards for recycling and emissions reduction. Conditions are included in this section of the permit to address the requirements specified at §82.156 for persons opening appliances for maintenance, service, repair, or disposal; §82.158 for equipment used during the maintenance, service, repair, or disposal of appliances; §82.161 for certification by an approved technician certification program of persons performing maintenance, service, repair, or disposal of appliances; §82.166 for recordkeeping; § 82.158 for leak repair requirements; and §82.166 for refrigerant purchase records for appliances normally containing 50 or more pounds of refrigerant.

The following table lists the Oklahoma Air Quality Rules that are not applicable to printing operations on a facility-wide basis. Rules applicable to a specific emission unit are listed separately.

Facility-wide Summary

Non-applicable Oklahoma Air Quality Rules

OAC 252:100-8	Permits for Major Sources	Ineligible
OAC 252:100-11	Alternative Emissions Reduction	Ineligible*
OAC 252:100-15	Mobile Sources	not a covered source
OAC 252:100-17	Incinerators	not a covered source
OAC 252:100-23	Cotton Gins	not a covered source
OAC 252:100-24	Grain Elevators	not a covered source
OAC 252:100-35	Carbon Monoxide	not a covered source
OAC 252:100-37, Part 5	Control of VOCs in Coating Operations	not a covered source
OAC 252:100-39, Part 3	Petroleum Refinery Operations	not a covered source
OAC 252:100-39, Part 5	Petroleum Processing and Storage	not a covered source
OAC 252:100-39, Part 7	Specific Operations (except 39-43)	not a covered source
OAC 252:100-39, Part 7	39-43: Graphic Arts Systems	Ineligible**
OAC 252:100-43, Part 3	Specific Testing Methods	not a covered source

*Ineligible for Authorization to Construct. May be eligible if addressed in an individual permit and carried over into Authorization to Operate.

**Applies to major sources of VOCs

Non-applicable Federal Regulations

40 CFR Part 52	Prevention of Significant Deterioration	ineligible
40 CFR Part 59, Subpart B	National VOC Standards for Automobile Refinish Coatings	ineligible
40 CFR Part 59, Subpart D	National VOC Standards for Architectural Coatings	ineligible
40 CFR Part 64	Compliance Assurance Monitoring	ineligible
40 CFR Part 68	Chemical Accident Prevention	ineligible
40 CFR Part 82, Subpart B	Stratospheric Ozone for Servicing of MVACs	ineligible
40 CFR Part 82, Subpart D	Stratospheric Ozone for Federal Procurement	ineligible
40 CFR Part 82, Subpart E	Stratospheric Ozone for Labeling of Ozone-Depleting Products	ineligible
40 CFR Part 82, Subpart G	Stratospheric Ozone for the Significant New Alternatives Policy Program	ineligible
40 CFR Part 82, Subpart H	Stratospheric Ozone for Halon Emissions Reduction	ineligible

PRINTING OPERATION REQUIREMENTS

Oklahoma Air Pollution Control Rules

OAC 252:100-19 (Control of Emission of PM)

[Appendix G Applicable]

Subchapter 19 controls the emission of particulate matter from both fuel burning equipment and industrial processes. Allowable particulate matter emissions rates are established for both new and existing directly fired fuel-burning units and industrial processes. Emissions limits are specified in OAC 252:100, Appendix C for any new or existing fuel-burning unit, Appendix D for indirectly-fired wood fuel-burning units, and Appendix G for any new or existing directly-fired fuel-burning unit or from any emission point in an industrial process.

The permit assures compliance with this rule using the following approach:

Fuel-burning equipment is addressed below in the Heater/Boiler/Thermal Oxidizer Requirements section. The applicable requirement for printing operations is the particulate matter standard in Appendix G for "any emission point in an industrial process." The permit requires establishing hourly limitations in the authorization for those emission points that have the potential to exceed allowable rates. The permittee is also required to monitor and keep records of the hourly process weight rate, annual throughput, type of control device used if any, efficiency of the control device, and the hours of operations.

Federal Regulations

New Source Performance Standards (NSPS), 40 CFR Part 60

[Applicable]

Subpart QQ (Graphic Arts Industry: Publication Rotogravure Printing) applies to each publication rotogravure printing press (not a proof press) that commenced construction, modification, or reconstruction after October 28, 1980. The standard prohibits discharge into the atmosphere from any publication rotogravure printing press VOC greater than 16 percent of the total mass of VOC solvent and water used during any 30 consecutive calendar days. The water used includes only water contained in waterborne raw inks and related coatings and water added for dilution with waterborne ink systems. Usage records are to be maintained on at least a weekly basis.

Subpart FFF (Flexible Vinyl and Urethane Coating and Printing) applies to each rotogravure printing line used to print or coat flexible vinyl or urethane products that began construction, modification, or reconstruction after January 18, 1983. The provisions of §60.584(a) requiring monitoring of operations will not apply to rotogravure printing line controlled by a solvent recovery emission control device until EPA has promulgated performance specifications under appendix B for the continuous monitoring system. After the promulgation of performance specifications, these provisions will apply to each rotogravure printing line. Facilities controlled by a solvent recovery emission control device that become subject to the standard prior to promulgation of performance specifications must conduct performance tests in accordance with §60.13(b) after performance specifications are promulgated. The standard requires that on and after the date on which the performance test required by §60.8 has been completed, each owner or operator subject to this subpart shall either use inks with a weighted average VOC content less than 1.0 kilogram VOC per kilogram ink solids at each affected facility, or reduce VOC emissions to the atmosphere by 85 percent from each rotogravure printing line.

The permit assures compliance with this regulation using the following approach:

Specific conditions are included in the permit to adopt these requirements by reference.

HEATER/BOILER/THERMAL OXIDIZER REQUIREMENTS**Oklahoma Air Pollution Control Rules****OAC 252:100-19 (Emissions of PM)****[Applicable]**

Subchapter 19-4 regulates the amount of particulates released into the air. Fuel-burning units are those combustion devices that are used to convert fuel to usable energy. This subchapter specifies that particulate matter (PM) emission from new or existing fuel-burning units not exceed the limits specified in Appendix C of OAC 252:100-19.

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct under the permit is restricted to those facilities using natural gas or LPG; or other authorized fuels, provided those fuels have a maximum of 0.8 wt% sulfur to assure compliance with the requirements of this subchapter. Table 1.4-2 of AP-42 (3/98) lists the total PM emissions for natural gas to be 7.6 lb/MMft³ or about 0.0076 lb/MMBTU, which is in compliance for all heat input ranges. For other fuels authorized under this general permit, Tables 1.3-1 & 1.3-2 of AP-42 (9/98) show the highest TPM emissions to be 11 lb/10³ gallon. Using a "worst case" of 135,000 BTU/gallon gives 0.08 lbs/MMBTU, which is also in compliance for all heat input ranges. The compliance demonstration for using natural gas or LPG only requires certification in the application that equipment will be fueled by natural gas or LPG. The compliance demonstration for all fuels authorized under this general permit except natural gas requires a fuel composition analysis be included in the application, and a fuel composition analysis be performed once per load thereafter.

OAC 252:100-33 (Control of Emission of Nitrogen Oxides)**[Applicable]**

Subchapter 33 prohibits discharge into the atmosphere of NO_x in excess of 0.2 lb/MMBTU, 3-hour average of heat input from gas-fired fuel-burning equipment and 0.3 lb/MMBTU3-hour average of heat input from liquid-fired fuel-burning equipment, for any new equipment as defined in Section 1.1 of Subchapter 33, and with a rated heat input of 50 MMBTUH or more.

The permit assures compliance with this regulation using the following approach:

The permittee is required to keep a record of the manufacturer's specifications on the equipment documenting initial compliance for each type of fuel burned. This record is to be updated any time the burner is replaced or modified. To assure continuing compliance, the permittee is required to perform an annual combustion optimization (tune-up) using methods specified in Appendix B of the permit unless the burner is equipped with a continuous automated combustion management and control technology system. The purpose of the tune-up is to optimize combustion while minimizing NO_x emissions. Consistent with the Subchapter 37 requirement to minimize VOC emissions, the permittee must tune the burner to minimize VOC emissions while maintaining the NO_x standard. In addition, the permittee is required to maintain records of all tune-ups, maintenance, and adjustments made to the equipment, including all documents and calculations used to determine reduced NO_x emission settings.

OAC 252:100-37 (Control of Emission of Volatile Organic Compounds)**[Applicable]**

Subchapter 37 limits the emission of organic materials from stationary sources. Emission limitations, design criteria, and work practice standards are specified in the regulation for various

sources, including storage tanks, effluent water separators, pumps and compressors, coating operations, waste gas disposal, and fuel-burning and refuse-burning equipment.

Part 7 requires fuel-burning equipment to be operated and maintained so as to minimize emissions. Temperature and available air must be sufficient to provide essentially complete combustion.

The permit assures compliance with this regulation using the following approach:

The permittee is required to maintain records of all tune-ups, maintenance, and adjustments made to such equipment.

Federal Regulations

NSPS, 40 CFR Part 60

[Applicable]

Subpart Dc. This subpart applies to small industrial-commercial-institutional steam generating units (boilers) that have been constructed, modified, or reconstructed after June 9, 1989, and have a maximum design heat input capacity between 10 and 100 MMBTUH.

The permit assures compliance with this regulation using the following approach:

Specific conditions are included in the permit to adopt these requirements by reference. The only standard applicable to natural gas fired steam generating units is a requirement for the owner or operator to keep records of the fuel used.

PACKAGING REQUIREMENTS

Oklahoma Air Pollution Control Rules

OAC 252:100-19 (Control of Emission of PM)

[Appendix G Applicable]

Subchapter 19 controls the emission of particulate matter from both fuel burning equipment and industrial processes. Allowable particulate matter emissions rates are established for both new and existing fuel-burning units and industrial processes. Emission limits are specified in OAC 252:100, Appendix C for any new or existing fuel-burning unit, Appendix D for indirectly-fired wood fuel-burning units, and Appendix G for any new or existing directly-fired fuel-burning unit or from any emission point in an industrial process.

The permit assures compliance with this regulation using the following approach:

Fuel-burning equipment has been addressed previously in the "Heater/Boiler/Thermal Oxidizer" section. The applicable requirement for packaging operations is the particulate matter standard in Appendix G for "any emission point in an industrial process." The permit requires establishing hourly limitations in the authorization for those emission points that have the potential to exceed allowable rates. The permittee is also required to monitor and keep records of the hourly process weight rate, annual throughput, type of control device used if any, efficiency of the control device, and the hours of operations.

Federal Regulations

National VOC Standards (40 CFR PART 59)

[Subpart C Applicable]

Subpart C (Consumer Products) applies to certain consumer products manufactured or imported on or after December 10, 1998 for sale or distribution in the United States. The regulated entity is the manufacturer or importer of the product and any distributor that is named on the product label. The manufacturer or importer of the product is a regulated entity for purposes of compliance with the volatile organic compounds (VOC) content or emission limits in §49.203, regardless of whether the manufacturer or importer is named on the label or not. The distributor, if named on the label, is the regulated entity for purposes of compliance with all sections of this part except for §59.203. Distributors whose names do not appear on the label are not regulated entities. If no distributor is named on the label, then the manufacturer or importer is responsible for compliance with all sections of this part. The standard requires that subject consumer products not exceed specified VOC and HVOC content levels.

The permit assures compliance with this regulation using the following approach:

Specific conditions are included in the permit to adopt these requirements by reference.

STORAGE TANK REQUIREMENTS

Oklahoma Air Pollution Control Rules

OAC 252:100-37 (Control of Emission of VOCs)

[Parts 1 and 3 Applicable]

This subchapter affects storage tanks (except pressure tanks) built after December 28, 1974 and with a capacity of 400 gallons or more storing a VOC with a vapor pressure of 1.5 psia or greater under actual conditions. They must be equipped with a submerged fill pipe or a vapor-recovery system.

The permit assures compliance with this regulation using the following approach:

Tanks constructed after December 28, 1974, storing a VOC with a vapor pressure greater than 1.5 psia, with a capacity greater than 400 gallons must be equipped with a submerged fill pipe or vapor recovery system. To demonstrate compliance with this rule, the permit requires maintenance of records showing the types of volatile petroleum liquids stored, the true vapor pressure of the liquid as stored, and the dimension and capacity of the tank. No conditions are included in the permit for storage tanks with a capacity greater than 40,000 gallons since they are ineligible for coverage under this permit.

OAC 252:100-39 (Emission of VOCs in Non-Attainment Areas and Former Nonattainment Areas)

[Part 7, Section 41 Applicable]

Control requirements are provided for certain existing and new facilities located in Tulsa and Oklahoma Counties. These requirements address petroleum liquid storage in external floating roof tanks greater than 40,000 gallons and storage of volatile organic compounds in storage tanks greater than 400 gallons. A vapor control system is required for tanks in Tulsa County containing gasoline or other volatile organic compounds with capacity greater than 2,000 gallons and less than 40,000 gallons.

The permit assures compliance with this regulation using the following approach:

Eligibility is restricted to those gasoline or other VOCs (with vapor pressure greater than 1.5 psia) tanks constructed in Tulsa County with a capacity less than 2,000 gallons. Thus, the only requirement that applies is the installation and operation of a permanent submerged fill pipe for any tank with capacity greater than 400 gallons.

Federal Regulations

New Source Performance Standards (NSPS), 40 CFR Part 60

[Applicable]

Subpart Kb. This subpart applies to certain storage vessels for volatile organic liquids greater than 40 cubic meters (10,568 gallons) that were constructed or modified after July 23, 1984. Those vessels with a capacity less than 75 cubic meters (19,815 gallons) are only required to maintain records of dimension and capacity. Those vessels with a capacity between 75 and 151 cubic meters (39,894 gallons) and vapor pressure between 27.6 (4 psia) and 76.6 kPa (11.1 psia), and those vessels with a capacity greater than 151 cubic meters with a vapor pressure between 5.2 (0.75 psia) and 76.6 kPa must be equipped with a fixed roof in combination with an internal floating roof, an external floating roof, a closed vent system and control device, or their equivalent. Certain records are required to be kept for these facilities.

The permit assures compliance with this regulation using the following approach:

Specific operational conditions are included in the permit to adopt these requirements. No conditions are included in the permit for storage tanks with a capacity greater than 40,000 gallons since they are ineligible for coverage under this permit.

CONTROL DEVICES

Control devices typically expected at these facilities include thermal and catalytic oxidizers, absorbers, condensers, and carbon adsorbers to reduce VOC/HAP emissions from the printing processes; and filters, baghouses, and dry (venturi) scrubbers to capture particulate matter from packaging operations. Note that these requirements may be superseded by more stringent monitoring if an individual construction permit is needed to develop other site-specific conditions to assure compliance with a particular rule, e.g., compliance with a BACT determination or MAAC under OAC 252:100-41.

The primary operational parameters for a thermal or catalytic oxidizer are the exhaust or inlet and exhaust temperature. Thus, oxidizers must be constructed with temperature sensors that measure outlet, or inlet and outlet temperatures. The permittee is required to determine the normal range of operating parameters that will assure that the system is meeting emissions limitations at all times, i.e., when periodic testing is not required, or between tests. In addition, continuous monitoring of the temperatures is required.

The primary operational parameters for absorbers (wet scrubbers) are the pressure drop across the scrubber and the flow rate of the scrubbing solution. The permittee is required to determine the normal range of differential pressure across the scrubber and flow rate of the scrubbing solution that will assure that the system is meeting emissions limitations at all times, i.e., when periodic testing is not required, or between tests. Monitoring and recording of the pressure drop and flow rate is required daily.

The primary operational parameter for a condenser is the outlet, or inlet and exhaust, temperature. Thus, condensers must be constructed with temperature sensors that measure outlet, or inlet and outlet, temperatures. The permittee is required to determine the normal range of operating parameters that will assure that the system is meeting emissions limitations at all times, i.e., when periodic testing is not required, or between tests. In addition, continuous monitoring of the temperatures is required.

The primary operational parameter for a carbon adsorber is the carbon replacement or regenerative frequency limit. The most likely method used to determine breakthrough is to measure the VOC concentration. Thus, daily monitoring of VOC concentrations in the exhaust stack is required. The permittee is required to determine the normal range of operating parameters, e.g., VOC concentration, carbon bed temperature, etc., that will assure that the system is meeting emissions limitations at all times, i.e., when periodic testing is not required, or between tests.

The primary operational parameter for fabric filters or baghouse systems is the pressure drop across the filters. The permittee is required to determine the normal range of differential pressure across the filters that will assure that the system is meeting emissions limitations at all times, i.e., when periodic testing is not required, or between tests. At least once per month, the permittee is required to inspect the baghouse cleaning system, dust removal system, and fan, and perform maintenance as needed. At least annually, or during each outage period that is longer in duration than 1 week, the permittee is required to conduct a thorough baghouse inspection, including the

filter bags, baghouse structure, expansion joints, turning vanes, and dampers, and conduct a review of all inspection and maintenance logs. Maintenance shall be performed as needed. The permittee is required to maintain logs of all visible emissions observations, baghouse inspections, pressure drop measured, and maintenance performed. Monitoring and recording of the pressure drop is required weekly.

The primary operational parameter for a cyclone is the pressure drop across the cyclone. The permittee is required to determine the normal range of differential pressure across the cyclone that will assure that the system is meeting emissions limitations at all times, i.e., when periodic testing is not required, or between tests. In lieu of measuring the pressure drop across the cyclone, the permittee may measure the pressure drop across a wet scrubber located immediately upstream of the cyclone to determine that both the scrubber and cyclone are properly operated. Monitoring and recording of the pressure drop is required weekly.

TIER CLASSIFICATION AND PUBLIC REVIEW

Processing of a new General Permit has been classified as Tier II based on OAC 252:4-7-33(c)(1). A request for an Authorization under this General Permit will typically be classified as Tier I. No notice is required for an Authorization under this General Permit, unless it includes a compliance schedule.

DEQ published the "Notice of Tier II Draft Permit" in the Daily Oklahoman and the Tulsa World on November 21, 2002. The notice stated that the draft permit was available for public review at the AQD office in Oklahoma City and Tulsa, and on the Air Quality section of the DEQ web page at www.deq.state.ok.us. No comments were received during the 30-day comment period.

RESPONSE TO COMMENTS

No comments were received. However, minor changes were made by AQD staff to clarify some language in the evaluation memorandum and the permit. No significant changes were made to the permit.

SUMMARY

Applicants must demonstrate eligibility for coverage under this General Permit and that they are able to comply with applicable air quality rules and regulations. Ambient air quality standards are not threatened at any of the sites eligible for coverage under this General Permit. Issuance of the permit is recommended.

REFERENCES

1. Stappa/Alapco/EPA, Emission Inventory Improvement Program, "Technical Report: Area Sources and Area Source Method Abstracts: Graphic Arts," Vol. III, Chapter 7, November 1996.
2. AP-42 (9/98) "Compilation of Air Pollution Emission Factors"

3. Office of Enforcement and Compliance Assurance, United States Environmental Protection Agency, EPA 310-R-95-014, "Profile Of The Printing Industry," September, 1995
4. Office of Pollution Prevention and Toxics, United States Environmental Protection Agency, EPA 744-R-94-003, "Printing Industry & Use Cluster Profile," June, 1994
5. Office of Air Quality Planning and Standards, United States Environmental Protection Agency, EPA 456/R-98-003, "State Experience Integrating Pollution Prevention Into Permits," September 1995
6. Office of Pollution Prevention and Toxics, United States Environmental Protection Agency, EPA 744B-94-001 "Federal Environmental Regulations Potentially Affecting The Commercial Printing Industry," March 1994
7. Office Of Research And Development. United States Environmental Protection Agency, EPA/625/7-90/008, "Guides to Pollution Prevention: The Commercial Printing Industry," August 1990
8. USEPA, 40 CFR, Pt. 72, Subpart A, §72.2, Definitions, March 26, 1999.
9. AP-42 (9/98) "Compilation of Air Pollution Emission Factors," Appendix A.

APPENDIX A
Justification to Document Compliance w/OAC 252:100-31
Fuel-burning equipment

PART 5. NEW EQUIPMENT STANDARDS

252:100-31-25 Fuel-burning equipment.

(a) Emission limit.

(1) **Gas-fired fuel-burning equipment.** Sulfur oxide emissions (measured as sulfur dioxide) from any new gas-fired fuel-burning equipment shall not exceed 0.2 lbs/MMBTU heat input (86 ng/J).

(2) **Liquid-fired fuel-burning equipment.** Sulfur oxide emissions (measured as sulfur dioxide) from new liquid-fired fuel-burning equipment shall not exceed 0.8 lbs/MMBTU heat input (340 ng/J).

Justification: New Equipment Standard

The amount of SO₂ produced by burning natural gas is dependent upon the conversion of sulfur compounds in the gas, measured as TRS, to SO₂. Sulfur levels in natural gas used to fuel these facilities are not expected to exceed 2 grains/100 scf.⁸ If the conversion of all sulfur compounds, measured as TRS, is on a one mole TRS to one mole SO₂ basis, then the amount of SO₂ generated can be calculated as:

$$\frac{2 \text{ grain } S}{100 \text{ scf}} \times \frac{1 \text{ pound}}{7000 \text{ grains}} \times \frac{1 \text{ mole}}{32 \text{ lb } S} \times \frac{64 \text{ lb } SO_2}{1 \text{ mole}} = 5.714 \times 10^{-6} \frac{\text{lb } SO_2}{\text{scf}}$$

$$5.714 \times 10^{-6} \frac{\text{lb } SO_2}{\text{scf}} \times \frac{1 \text{ scf}}{1050 \text{ BTU}} \times \frac{10^6 \text{ BTU}}{\text{MMBTU}} = 0.005 \frac{\text{lb } SO_2}{\text{MMBTU}}$$

This is much less than the standard. Thus, this eligibility restriction assures compliance with the new equipment standard of 0.2 lbs/MMBTU heat input.

Likewise, the amount of SO₂ produced by burning a liquid fuel can be calculated in a similar manner. The following table shows the characteristics of the various fuels expected to be used. The terms distillate oils and residual oils are further distinguished by grade numbers, with #2 being distillate oil; #5 and #6 being residual oils; and #4 being either distillate oil or a mixture of distillate and residual oils. Note that liquid petroleum gas (LPG), typically made by fractionating natural gas into its various components, has negligible sulfur content. No SO₂ emissions are expected from using LPG as a fuel.

Fuel Characteristics⁹

Fuel Type	Density (lb/gallon)	Heating Value (BTU/gallon)	Wt. % Sulfur
Residual Oil	7.88	150,000	0.5-4.0
Distillate Oil	7.05	140,000	0.2-1.0
Diesel Fuel	7.0	137,000	0.4
Liquid Petroleum Gas	NA	94,000	negligible

The maximum allowable sulfur content of the fuel oil can be calculated using a worst case of a liquid fuel with 135,000 BTU/gallon and density of 7.0 lb/gallon, as follows.

$$\frac{0.8 \text{ lb SO}_2}{\text{MMBTU}} \times \frac{135,000 \text{ BTU}}{\text{gallon}} \times \frac{1 \text{ gallon}}{7 \text{ pounds}} \times \frac{\text{MMBTU}}{10^6 \text{ BTU}} \times \frac{1 \text{ mole}}{64 \text{ lb SO}_2} \times \frac{32 \text{ lb S}}{1 \text{ mole}} = 0.0077 \frac{\text{lb S}}{\text{lb fuel}}$$

$$0.0077 \frac{\text{lb S}}{\text{lb fuel}} \times 100 = 0.8 \text{ wt\%}$$

Thus, an eligibility restriction of liquid fuels consisting of only liquid petroleum gas, or residual or distillate oil or diesel fuel with a maximum of 0.8 wt% S assures compliance with the new equipment standard of 0.8 lbs/MMBTU heat input. A permittee not meeting this eligibility requirement may be eligible for coverage under an Authorization to Operate if they obtain an individual construction permit and all relevant requirements and limitations in that permit are incorporated into the Authorization to Operate.

